Ejercicios semana 6

Abigail Ramos

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- **Ejercicio 1:** Generar una muestra de tamaño n=200 perteneciente a una población normal $N(10; 2^2)$.

```
#Muestra de una distribución normal
NormalSamples <- as.data.frame(matrix(rnorm(1*200, mean=10, sd=4), ncol=200))
rownames(NormalSamples) <- "sample"
colnames(NormalSamples) <- paste("obs", 1:200, sep="")
NormalSamples <- within(NormalSamples, {
  mean <- rowMeans(NormalSamples[,1:200])
})
NormalSamples
```

```
##            obs1     obs2     obs3     obs4     obs5     obs6     obs7     obs8
## sample 8.775231 8.471545 13.91222 16.33484 9.349965 13.77675 8.945145 4.447973
##            obs9    obs10    obs11    obs12    obs13    obs14    obs15    obs16
## sample 5.374835 1.264972 13.53879 11.07359 13.65149 5.391233 20.41981 17.50713
##           obs17    obs18    obs19    obs20    obs21    obs22    obs23    obs24
## sample 12.91077 14.98351 4.824548 8.214368 7.138302 12.48964 8.710099 8.669411
##           obs25    obs26    obs27    obs28    obs29    obs30    obs31   obs32
## sample 11.03318 11.37824 5.668241 7.604858 8.488716 8.989894 14.73238 4.49836
##           obs33   obs34    obs35    obs36    obs37    obs38    obs39    obs40
## sample 21.45362 6.30893 12.86517 13.17057 10.33471 9.725218 12.59994 2.685528
##           obs41    obs42    obs43    obs44    obs45    obs46    obs47    obs48
## sample 5.502889 8.418482 11.82887 9.961436 18.47653 13.77991 6.322368 10.76808
##           obs49    obs50    obs51    obs52    obs53    obs54    obs55   obs56
## sample 4.570442 7.274874 7.175644 17.61401 9.486929 6.563454 10.30014 9.49719
##           obs57   obs58    obs59    obs60    obs61    obs62    obs63    obs64
## sample 12.01228 8.37635 13.05708 7.892955 14.02764 10.68674 13.12344 12.75255
##           obs65    obs66    obs67    obs68    obs69    obs70    obs71    obs72
## sample 10.94069 11.00547 8.835158 11.97505 19.26351 6.771181 8.166144 7.454067
##           obs73    obs74    obs75    obs76    obs77    obs78    obs79    obs80
## sample 8.876083 3.554724 9.452413 9.189954 7.463247 5.559865 8.638129 6.834488
##           obs81    obs82    obs83    obs84    obs85    obs86    obs87    obs88
## sample 12.82333 16.81591 5.137717 6.415426 9.904164 11.21498 12.46718 9.868886
##           obs89    obs90    obs91    obs92    obs93    obs94    obs95    obs96
## sample 8.855216 13.18348 12.48621 3.940441 11.42207 9.54477 5.829987 17.81124
##           obs97    obs98    obs99   obs100   obs101   obs102   obs103   obs104
## sample 12.45724 8.800427 8.393707 11.41391 10.38009 9.259027 11.52436 5.173115
##          obs105   obs106   obs107   obs108   obs109   obs110   obs111   obs112
## sample 8.772427 10.91733 15.41645 6.890476 6.657461 7.726422 12.68024 3.676843
##          obs113   obs114   obs115   obs116   obs117  obs118   obs119   obs120
## sample 7.681425 10.67752 2.017505 7.701083 8.829032 10.6087 8.813612 10.49906
##          obs121   obs122  obs123   obs124   obs125   obs126   obs127   obs128
## sample 4.368992 8.757691 12.8543 2.990736 11.67324 13.94847 17.23321 4.234719
##          obs129   obs130   obs131   obs132   obs133   obs134   obs135   obs136
```

```
## sample 5.262151 13.34537 18.42766 18.35508 10.36702 7.136546 6.343725 5.823478
##          obs137   obs138   obs139  obs140   obs141   obs142   obs143   obs144
## sample 14.29968 17.30097 16.47648 6.67667 9.061254 12.35229 6.338606 8.756626
##          obs145   obs146   obs147   obs148   obs149   obs150   obs151   obs152
## sample 14.66143 8.276048 12.30044 7.178019 10.68802 7.606127 7.796687 1.543364
##          obs153   obs154   obs155   obs156   obs157   obs158   obs159   obs160
## sample 3.597589 8.607974 7.041923 11.66406 6.152965 8.041362 8.027568 6.858896
##         obs161   obs162   obs163   obs164   obs165   obs166   obs167   obs168
## sample 14.8533 10.24867 8.743148 13.65966 5.444296 8.489185 14.22806 11.28942
##          obs169   obs170   obs171  obs172   obs173   obs174   obs175  obs176
## sample 14.52152 10.26399 9.418585 11.6214 11.05181 3.765058 16.18975 14.7667
##         obs177   obs178   obs179   obs180   obs181   obs182   obs183  obs184
## sample 17.4547 11.28936 6.571365 10.77439 14.78907 9.944022 12.73083 6.20546
##          obs185   obs186   obs187   obs188   obs189   obs190   obs191   obs192
## sample 11.50934 8.071164 15.21486 5.525467 9.266889 15.98594 5.191761 6.506035
##         obs193   obs194   obs195   obs196   obs197   obs198   obs199   obs200
## sample 6.21839 5.721164 10.05404 7.070857 24.42537 5.875863 12.45569 13.09911
##            mean
## sample 10.01393
```

- **Ejercicio 2:** ¿Cuál es la probabilidad a la derecha de 18.55 para una Variable aleatoria X con distribución Chi-cuadrado de 12 grados de libertad?

```
#probabilidad acumulada de chi-cuadrado
pchisq(c(18.55), df=12, lower.tail=FALSE)
```

```
## [1] 0.09998251
```

- **Ejercicio 3:** Generar 100 números aleatorios de una distribución Normal con media 4.5 y desviación estándar 0.75

```
AleatorioNorm <- as.data.frame(matrix(rnorm(1*100, mean=4.5, sd=0.75), ncol=100))
rownames(AleatorioNorm) <- "sample"
colnames(AleatorioNorm) <- paste("obs", 1:100, sep="")
AleatorioNorm
```

```
##            obs1     obs2     obs3     obs4     obs5     obs6     obs7     obs8
## sample 4.369447 4.914061 4.569587 6.390343 4.455817 5.289099 5.056828 3.489098
##            obs9    obs10   obs11    obs12   obs13    obs14    obs15    obs16
## sample 5.896333 4.614497 4.15614 4.051959 4.61629 3.820352 4.345902 4.948235
##           obs17    obs18    obs19    obs20    obs21    obs22    obs23   obs24
## sample 4.573661 3.708194 3.537293 5.047828 6.056178 4.301747 4.670612 4.78603
##           obs25    obs26    obs27   obs28    obs29    obs30    obs31    obs32
## sample 6.602204 4.080955 4.623066 4.79254 5.804981 4.367712 4.819967 5.232982
##           obs33    obs34    obs35    obs36    obs37    obs38    obs39   obs40
## sample 4.533541 4.287078 3.994102 3.291081 3.454121 4.105363 3.948204 2.99038
##           obs41    obs42    obs43   obs44    obs45    obs46    obs47    obs48
## sample 3.837977 3.444768 4.989401 4.06496 4.864908 5.386916 2.838448 3.737799
##           obs49    obs50    obs51    obs52    obs53    obs54    obs55    obs56
## sample 4.408562 4.974497 5.813791 3.865427 4.268804 4.036637 4.350168 4.224596
##           obs57    obs58   obs59    obs60    obs61    obs62   obs63    obs64
## sample 4.506433 4.705272 4.33552 3.503413 4.767057 4.111017 3.73813 5.582575
##           obs65    obs66    obs67    obs68    obs69   obs70    obs71    obs72
## sample 6.331181 5.869712 4.758064 3.836302 5.222818 3.57171 5.241551 3.984523
##           obs73    obs74    obs75    obs76    obs77   obs78    obs79    obs80
## sample 4.192483 3.765507 4.866424 4.274107 3.635879 4.00131 5.472183 5.422626
##           obs81    obs82    obs83    obs84   obs85    obs86    obs87    obs88
## sample 4.565525 3.102706 3.385884 3.084824 4.40366 4.426202 5.192175 4.254742
##           obs89    obs90    obs91    obs92    obs93    obs94    obs95    obs96
## sample 3.977161 3.813461 4.401544 4.696264 5.411009 4.446714 4.765457 1.896977
##           obs97    obs98    obs99   obs100
## sample 4.022552 4.971632 4.562161 5.396565
```

- **Ejercicio 4:** Generar números aleatorios de una distribución exponencial, si la media es 2500.

```
ExponentialSamples <- as.data.frame(matrix(rexp(1*100, rate=2500), ncol=100))
rownames(ExponentialSamples) <- "sample"
colnames(ExponentialSamples) <- paste("obs", 1:100, sep="")
ExponentialSamples
```

```
##                obs1         obs2         obs3         obs4         obs5
## sample 0.0001209146 2.172855e-05 2.744918e-05 0.0006602937 3.974705e-05
##                obs6         obs7        obs8         obs9        obs10
## sample 3.306101e-05 0.0004219668 0.001155497 3.233419e-05 0.0003248469
##               obs11        obs12        obs13        obs14       obs15
## sample 7.744589e-05 0.0006936701 0.0004099263 0.0001865502 0.001075599
##               obs16        obs17        obs18        obs19        obs20
```

```
## sample 0.0004361864 4.434726e-05 0.0001707749 0.0002502343 1.234848e-05
##               obs21        obs22        obs23        obs24        obs25
## sample 0.0004120822 0.0005092334 4.141407e-06 2.360258e-05 0.0001505569
##               obs26       obs27        obs28       obs29        obs30
## sample 4.306478e-05 0.001040123 0.0001125928 0.001040812 0.0001403309
##               obs31        obs32        obs33        obs34        obs35
## sample 4.808815e-05 0.0004552012 0.0007557693 1.210203e-05 7.779294e-05
##               obs36        obs37        obs38        obs39        obs40
## sample 0.0001596779 0.0002071739 0.0002794428 0.0004515983 9.289026e-06
##              obs41       obs42        obs43        obs44        obs45
## sample 8.9843e-05 0.001821581 0.0005358346 0.0006536553 0.0001453991
##               obs46        obs47       obs48        obs49        obs50
## sample 5.742973e-05 0.0006867211 0.000508097 0.0006356298 0.0008072274
##               obs51        obs52        obs53       obs54        obs55
## sample 4.524091e-05 9.696877e-05 0.0005777938 0.001007437 0.0001420011
##               obs56        obs57        obs58        obs59        obs60
## sample 0.0001210152 1.337079e-05 0.0007362444 0.0001250676 0.0004526847
##               obs61        obs62        obs63       obs64        obs65
## sample 0.0007562032 0.0009016754 0.0002910639 0.001004838 0.0002867576
##               obs66        obs67        obs68        obs69       obs70
## sample 0.0005250536 0.0001690919 5.699096e-05 0.0002387036 0.000427855
##               obs71        obs72        obs73        obs74       obs75
## sample 8.375979e-05 0.0006189161 0.0002466424 0.0002353211 0.001287878
##               obs76        obs77       obs78       obs79        obs80
## sample 0.0007872683 0.0001072452 2.40125e-05 0.000608638 0.0001430203
##              obs81        obs82        obs83        obs84        obs85
## sample 0.000134246 0.0002243432 0.0007531961 0.0003099262 9.021074e-05
##               obs86        obs87       obs88        obs89        obs90
## sample 0.0002430999 0.0005874571 0.000431684 0.0003295359 0.0003378851
##               obs91        obs92        obs93        obs94        obs95
## sample 0.0002767443 5.649815e-05 0.0006729783 6.135076e-05 0.0001843574
##               obs96        obs97        obs98        obs99       obs100
## sample 0.0002596552 0.0002396679 5.952515e-05 0.0007893461 3.438024e-05
```